

***ALEUROCLAVA BAGAHFORMIS*, A NEW SPECIES OF WHITEFLY  
(HEMIPTERA: ALEYRODIDAE) FROM SOUTHEASTERN  
QUEENSLAND**

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**Abstract**

*Aleuroclava bagahformis* sp. n. is described from material collected from rainforests of southeastern Queensland. It has been found on the leaves of *Alangium villosum* (Alangiaceae) and represents the second species of this genus described from Australia. The unusual shape of the puparium and its systematic placement are discussed.

**Introduction**

Recent research by several workers has continued to throw light on the diverse Australian whitefly fauna (Martin 1999, Gillespie 2006, M. Coombs pers. comm.). The subtropical rainforests of southeastern Queensland have been the site of some recent collections of unique and interesting whitefly taxa, of which the new taxon described here forms a small part. Several of the newly discovered taxa have been found in relationship with only one host. Given the diverse nature of Australia's flora and the lack of attention given to whiteflies on Australian plants, this suggests that the Australian whitefly fauna may contain two to three times the present number of described species.

The genus *Aleuroclava* Singh is a large and diverse Asian genus of often small whiteflies. This genus is not well known from Australia, with presently only one described and a number of undescribed species recognised (Martin 1999). A new species is described below from specimens collected in southeastern Queensland. This taxon has a very small, dark puparium of a highly unusual nature, with a rectangular cephalothorax and a long, thin abdomen. These features, in combination with other characters such as the granular dorsum, lack of dorsal setation and features of the thoracic and abdominal tracheal pores, show most affinities with the genus *Aleuroclava* in which it is placed.

**Methods**

All slide mounted specimens are preserved in Canada Balsam mountant using the method outlined by Martin (1999). Database accession number for NSW DPI deposited specimens is indicated in brackets following specimen details. Type material is deposited in repositories as listed below. Photomicrographs were taken with a Micropublisher 5 RTV digital camera (QImaging) attached to a Leica MZ12.5 dissecting microscope and montaged images produced with AutoMontage Pro (Synchroscope P/L). Abbreviations used in this paper include: ANIC – Australian National Insect Collection, whitefly collection;

ASCU – Agricultural Scientific Collections Unit, NSW DPI, Orange; BMNH – The Natural History Museum, London; Qld – Queensland.

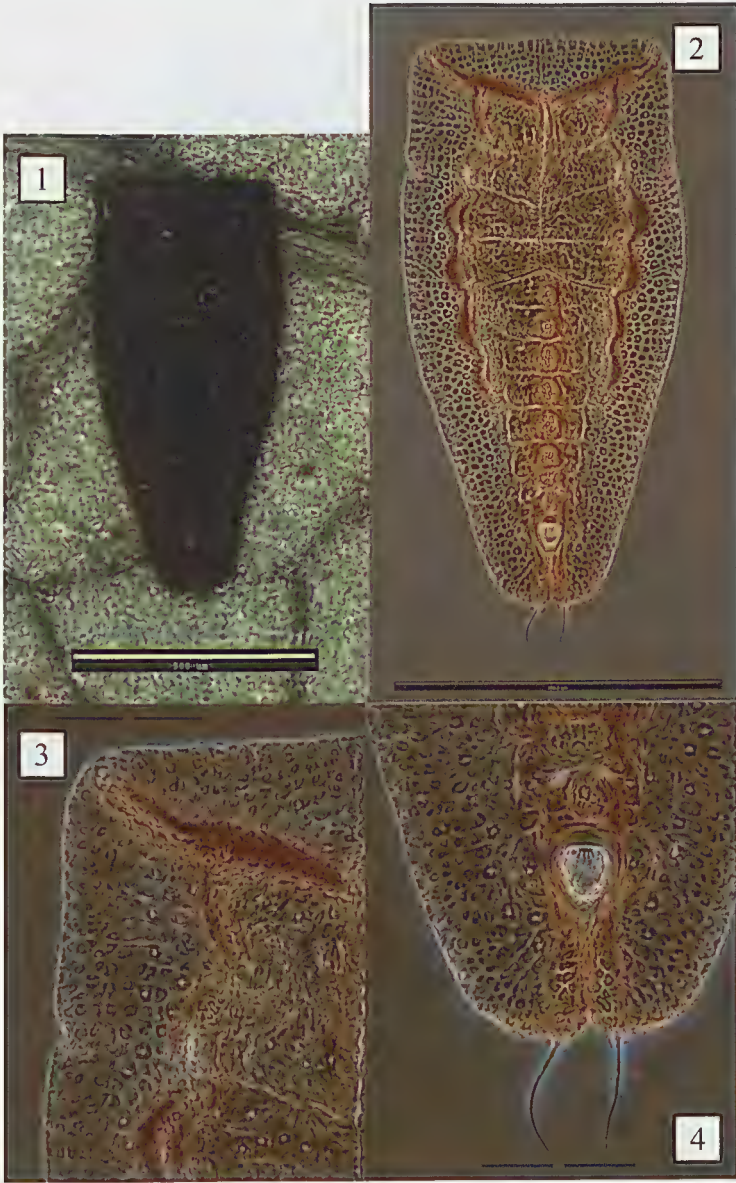
*Aleuroclava bagahformis* sp. n.

(Figs 1-6)

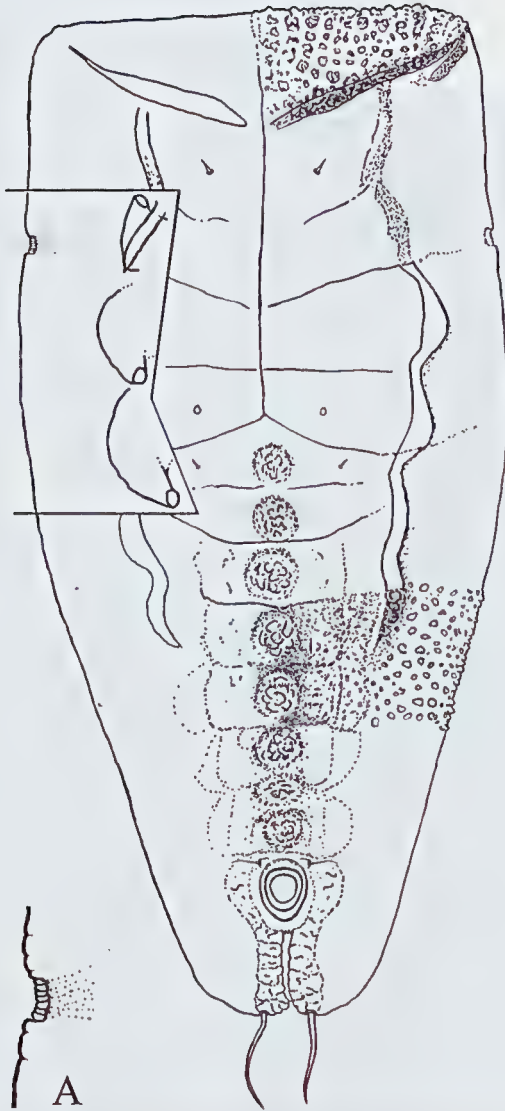
*Material examined.* *Holotype* puparium on slide, QUEENSLAND: ex *Alangium villosum*, '3 stumps', D'Aguilar N.P., 28.ix.2006, P.S. Gillespie & B.C. McNeil (ASCT00132260) (ASCU). *Paratypes*: 2 emerged pupal cases each on a slide, host unstated, '3 Stumps', Mt Glorious, 8.xii.2006, B.C. McNeil & M. Coombs. (ANIC, BMNH); 2 puparium slides ex *Alangium*, Mt Glorious, 7.ii.2007, M. Coombs & B.C. McNeil (ASCT00047573 (DNA=AM1928), ASCT00047541 (DNA=AM1929) – ASCU); 1 puparium on dry leaf, same data as holotype (ASCT00132255 - ASCU); 5 puparia (3 parasitized) each on leaf fragment, ex *Alangium*, Mt Glorious, 7.ii.2007, M. Coombs & B.C. McNeil (ASCT00132126 - ASCU).

*Description.* Puparium (Figs 1, 6) small, black, heavily sclerotised and requiring bleaching for viewing; shield-shaped with cephalothorax approximately rectangular in appearance. Pupa with a covering of fine, clear wax and lacking peripuparial wax. Some specimens with a distinctive transverse whitish stripe on dorsum between the thoracic tracheal pores and the moulting sutures and also with some small white markings on abdomen, particularly in the area of segment VII medially but the extent of these white markings varies considerably from specimen to specimen (Fig. 6). Puparia do not appear dimorphic. Length of pupa 890-1,100  $\mu\text{m}$ , width 400-540  $\mu\text{m}$ ; widest at metathoracic segment (Figs 1, 2, 5).

*Dorsum:* Puparium with more or less rectangular cephalothorax with anterolateral corners defining their anterior and lateral aspects (Figs 2-3). Anterior margin of cephalothorax straight and perpendicular to longitudinal axis of pupa. Apart from thoracic tracheal pores, lateral margins of cephalothorax straight and parallel to longitudinal axis of pupa. Abdomen elongate, narrowed and straight-sided (Figs 2-3). Margin not defined from subdorsum. Margin irregularly and finely crenulate with invaginations at thoracic and caudal tracheal openings. Thoracic tracheal invaginations shallow (wider than distance from margin) and with 4 or 5 finer crenulations. Puparium covered with coarse granules or rugosities. A pair of submedial folds or elevated extensions running longitudinally overlying the legs in the cephalothorax and the anterior part of the abdomen are present; these extend from anterolateral corner of pupa to abdominal segment IV (Figs 2-3). A raised ridge/submedial fold of rugose nature running parallel to anterior margin joins longitudinal folds anterolaterally in the cephalus (Fig. 3). Single large, coarse tubercle present medially on abdominal segments I-VIII (Figs 2, 3, 5). Abdominal segments sparingly defined medially although rugosity, elevation and medial tubercle of each segment masking slight rhachisiform shape. Abdominal segment VII little more than half the length of the preceding segment. Simple pores sparsely scattered over cephalothorax and



**Figs 1-4.** *A. bagahformis* puparium. (1) puparium habitus (holotype); (2) puparium slide; (3) cephalothorax detail; (4) abdomen detail. (Scale bars 1, 2 = 500 µm; 3, 4 = 100 µm).



**Fig. 5.** *A. bagahformis* puparium drawing. (Scale bar = 500  $\mu$ m). (A) = ventral detail of cephalothoracic tracheal pore.

abdomen. Narrow caudal furrow present (Fig. 4). Vasiform orifice rounded chordate, not elevated above dorsum and appearing to be set into a narrow, elevated rugose plateau extending posteriorly to the margin and bordering the caudal furrow (Fig. 4). Posterior margin of plateau between vasiform orifice and caudal furrow with a few narrow and coarsely serrate teeth. Interior margin of vasiform orifice with scalloping. Operculum slightly longer than wide, of rounded quadrilateral shape, filling anterior two thirds of vasiform orifice. Lingula enclosed and obscured by opercula. Vasiform orifice situated two or more lengths (90  $\mu\text{m}$ ) from posterior margin (Fig. 4).

Chaetotaxy: Anterior and posterior marginal setae present as minute, fine setae, those of the anterior margin being in the anterolateral corners of the cephalothorax. Cephalothoracic seta present and short (35  $\mu\text{m}$ ). First abdominal setae present and short (20  $\mu\text{m}$ ) and set more than five setal lengths apart from each other. Eighth abdominal setae present and twice as long as first abdominal setae (44  $\mu\text{m}$ ), situated anterolateral to vasiform orifice. Caudal setae long (85  $\mu\text{m}$ ) and situated on posterior margin close together (30  $\mu\text{m}$  apart). No other dorsal setae present.

Venter: Antenna short, only reaching to base of fore leg and situated immediately anterior to the fore leg (Fig. 5). Ventral abdominal setae short (20  $\mu\text{m}$ ) and situated slightly mesad of the vasiform orifice. Mid and hind legs with small seta at the base. Thoracic tracheal folds present as a small number of short, linear striations present mesad of invagination (Fig. 5). Detail of much of the venter, particularly in caudal region, difficult to discern due to highly rugose nature of dorsum.

*Etymology.* Latinised noun; *bagah* is an Aboriginal (Bunjalung) word for shield, referring to the distinctive shape of the puparium.

*Host plant.* *Alangium villosum* (Blume) Wangerin (Alangiaceae); Muskwood, a rainforest tree.

*Comments.* *Aleuroclava bagahformis* is found singly on the undersides of the leaves of the host tree. This distinctive species is unlikely to be confused with any other. The squared-off nature of the cephalothorax, the heavy rugosities on the dorsum, the diminutive size and the series of abdominal medial tubercles immediately distinguish this species from all other Australian whiteflies.

## Discussion

Although the nature of the legs and lack of compound pores clearly places *A. bagahformis* within the subfamily Aleyrodinae, this species shows such an irregular morphology that initial generic placement was difficult. Examination of the works by Martin (1985, 1988, 1999), Dumbleton (1956, 1957, 1961a, 1961b) and Corbett (1933, 1935a, 1935b, 1935c, 1936) of the whitefly fauna of Australia and neighbouring regions shows that there are no taxa similar to *A. bagahformis* known so far from those regions.

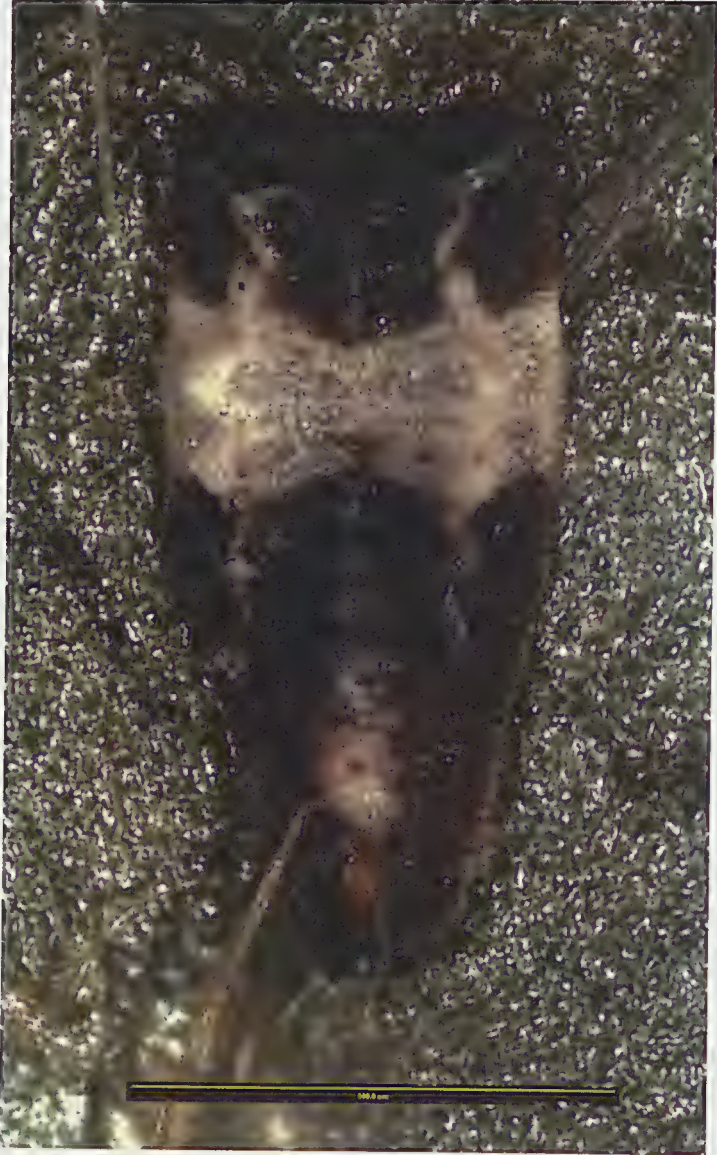


Fig. 6. *A. bagahformis* puparium habitus. (Scale bar = 500  $\mu$ m)

The invaginated thoracic and caudal tracheal pores of *A. bagahformis* are a character shared with species of *Dialeurodes* Cockerell, *Gomonella* Dumbleton, *Dialeurolonga* Dozier and *Aleuroclava* Singh. The new taxon differs from species of *Dialeurodes* and *Dialeurolonga* by being smaller, less rounded and darkly pigmented, characters often found in *Aleuroclava*. Further, the vasiform orifice of *Dialeurolonga* is often more elongate, with the opercula not fully occupying it, often leaving the lingula partially exposed. In the case of *Dialeurodes* the vasiform orifice is often chordate, small and removed some distance (usually greater than three vasiform orifice lengths) from the margin, features not found in *Aleuroclava* or this taxon. *A. bagahformis* lacks a concentric submarginal dorsal fold, a character that typifies *Gomonella*, although this sometimes is found in some other species of *Aleuroclava*. The highly sculptured dorsum of this species is also found in some other species of *Aleuroclava*.

DNA extracted from the holotype prior to slide mounting may be used in future to provide evidence of the affinities of this taxon. The discovery of such an unusual taxon provides evidence of the unique character and diversity of the Australian whitefly fauna and also highlights the often highly host specific nature of many endemic whitefly species. A more systematic approach to the collection of endemic whiteflies will undoubtedly show that there are many other new and unusual whitefly taxa awaiting discovery.

### Acknowledgements

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